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SYNERGY NOW: AUGMENTING CARRIER AIR OPERATIONS WITH STRATEGIC AIRCRAFT

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

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7

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Operational commanders could reduce their reaction time, lengthen their endurance and increase their lethality during short-notice military operations anywhere in the world by complementing carrier-based air operations with land-based strategic aircraft. A forward-based CVBG represents a quick, highly organized response, but lacks the sustainability and lethality of air operations the commander needs. Likewise, strategic aircraft can bring enhanced capabilities to a fight quickly, but lack a constant forward presence and on-scene command structure.

While neither carrier-based nor strategic air power can independently give the operational commander the speed, sustainability and lethality he needs, the combination of the two could. Operational commanders could greatly enhance combat effectiveness right away by embracing the doctrine envisioned by Joint Vision 2020, with assets from different branches actually working in concert rather than just in close proximity.[1] By providing carrier battle groups with strategic air assets, operational commanders could prosecute quicker, longer and heavier attacks simply by employing their current assets with greater synergy.

[1] Director for Strategic Plans and Policy, J5; Strategy Division. Joint Vision 2020. (Washington, DC: June 2000), 13.

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ABSTRACT

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While neither carrier-based nor strategic air power can independently give the operational commander the speed, sustainability and lethality he needs, the combination of the two could. Operational commanders could greatly enhance combat effectiveness right away by embracing the doctrine envisioned by Joint Vision 2020, with assets from different branches actually working in concert rather than just in close proximity.[1] By providing carrier battle groups with strategic air assets, operational commanders could prosecute quicker, longer and heavier attacks simply by employing their current assets with greater synergy.

CONTENTS

THE PROBLEM

The disintegration of the Soviet Union in the early 1990s prompted the United States to downsize its military, shifting its focus from operations against a single, large foe to operations against a wide array of potential enemies lurking in every corner of the globe. Since impending conflicts with several different adversaries are often brewing concurrently, the need to execute combat operations in a particular area could arise suddenly and with little warning. Therefore, operational commanders must be able to mount swift, sustained, overwhelming combat operations in far more locations than during the Cold War, but with far fewer assets. At present, no single military branch can independently provide the speed, endurance and lethality operational commanders need to overcome these challenges.[2]

THE SOLUTION

Operational commanders could drastically shorten the reaction time, lengthen the duration and increase the lethality of short-notice military operations anywhere in the world simply by augmenting carrier-based air operations with land-based strategic aircraft. Although a forward-based aircraft carrier battle group (CVBG) offers a swift, cohesive crisis response, it can operate at full capacity for a relatively short while and with relatively limited firepower.[3] On the other hand, strategic tankers, bombers and support aircraft can reach any Area of Responsibility (AOR) in a very short time due to their intercontinental ranges, but lack the sustained forward presence and on-scene command structure inherent to a CVBG. However, by executing truly joint operations, like those described in Joint Vision 2020, commanders could prosecute quicker, longer and heavier attacks against any enemy using the assets in the U.S. arsenal today.[4]

AIRCRAFT CARRIER OPERATIONS

Since a CVBG is an autonomous force, highly organized and prepared to perform short-

notice combat operations, it clearly provides operational commanders with an intimidating initial response to many crisis situations. While the CVBG nearest an AOR can normally begin operations on scene fairly quickly, its endurance and strike capacity are limited by the quantity of aircrews, aircraft and ordnance available on the ship. Operational commanders must understand the limitations of autonomous CVBG operations to employ them effectively.

Aircraft Carrier Reaction Time

Although a CVBG most often provides the fastest initial response to a crisis, operational commanders must understand the factors that can increase response time in order to mitigate them. Some of the most significant of these factors are the number of CVBGs available, the amount of prior warning time they are given and the distance they must travel to the AOR.

Presently, the U.S. has twelve aircraft carriers, five of which are at sea at any given time.[5] Therefore, CVBGs are dispersed widely enough to cover most potential crisis areas within a reasonable timeframe, offering especially rapid response to areas that are known to be highly volatile at a certain time. However, there are not enough CVBGs to permanently station one within immediate striking distance of every potential hot spot. Further, a location would have to be of tremendous importance to warrant tasking more than one CVBG against it.

If an expected crisis were to materialize, operational commanders could shorten a CVBG's reaction time by issuing a series of warning and planning orders as the probability of a strike increases. This gives the carrier force time to move toward the anticipated AOR and prepare for the anticipated contingencies. With the bulk of the mission planning completed during the warning period, the actual execution order simply triggers the implementation of these plans, making reaction time very short. In contrast, if the CVBG were to receive an unexpected strike order, it would require time to move to the proper location, plan the missions and prepare the crews and aircraft.

While on deployment, aircraft carriers normally remain at a high state of readiness. However, if a carrier must travel a long distance at a high rate of speed to reach an AOR, aircrew currency may also pose a problem that could delay flight operations. For example, pilot carrier landing currency is fourteen days for day landings and only seven days for night landings.[6] Since most combat missions are flown at night, the shorter currency requirement is usually the limiting factor. Unless the CVBG happens to be moving into the wind, flight training is not normally possible during high-speed transit, often causing aircrew currency to lapse while enroute to the AOR. At that point, the CVBG must conduct training sorties until the aircrews have regained currency.[7] An operational commander who understands these limitations could shorten CVBG reaction time by getting them into the proper position as early as possible with as much information as possible.

Aircraft Carrier Endurance

Operational commanders must also understand that many factors limit CVBG operational endurance. Some of these factors are personnel fatigue; maintenance requirements; and command, control and mission planning.

For example, the amount an aircrew can fly within a given time frame is regulated through standard operating procedures that are designed to prevent the aircrew fatigue that could lead to degraded flight operations. While these regulations increase the safety and effectiveness of aviators, they do place limits on the number of flight crews available at any given time.

Also, aircraft carriers have a limited number of deck crewmen to handle critical flight operations. Even using the most efficient scheduling techniques, these crews can only operate all four catapults and all four arresting wires at full capacity for a few days before fatigue degrades their performance to critical levels.[8]

Aircraft maintenance is another factor that affects the longevity of carrier air operations.

During any air operations, aircraft will require both scheduled and unscheduled maintenance. Increasing flight operational tempo will yield a corresponding increase in the amount of aircraft maintenance required. Traditionally, aircraft availability normally becomes critical after approximately three days.[9] Further, aircraft carriers are equipped with four catapults and four arresting cables for flight operations. Like all complex mechanisms, these require periodic maintenance during which they are unavailable for flight operations.

Command, control and mission planning capacity could also limit a CVBG's operational endurance.[10] During joint air operations, the Joint Forces Commander normally selects a Joint Forces Air Component Commander (JFACC) from the service branch supplying the preponderance of air assets to the mission.[11] In the case of predominantly naval air operations, this commander is often referred to the JFACC afloat.[12] Located within the CVBG, a JFACC afloat provides a highly organized command framework in the best place and in the shortest time. As the crisis escalates, the operational commander could simply provide more air assets to the existing JFACC framework. However, the physical constraints inherent to a JFACC afloat represent more limitations to the duration of full-scale, independent CVBG operations.

Initially located on the carrier for convenience, the JFACC afloat may move to a numbered fleet command ship to gain more space and capability. However, the JFACC afloat is inherently hampered by the finite amount of physical space, equipment and personnel available for mission planning and other staff functions aboard a ship. In most cases, the staff of a JFACC afloat is limited to approximately fifteen people. Experience has shown that a JFACC afloat can support only about 130 sorties per day with a single carrier and 200 sorties per day with a second carrier.[13] Such a small staff could only sustain this level of effort for a few days. Once operational demands begin to outweigh the capabilities of the JFACC afloat,

command duties should shift to a land-based air operations center. A land-based JFACC normally suffers fewer constraints than those aboard a ship, often employing over 400 staff members.[14] With the proper coordination, this transfer of command could provide a seamless transition from a light and lethal crisis response to a longer and more robust major operation.

Aircraft Carrier Lethality

In an attempt to increase flexibility and gain greater utility from the limited number of aircraft aboard a carrier, the U.S. Navy has acquired multi-role aircraft that are capable of performing a variety of missions. Generally, an aircraft carrier wing consists of 80 aircraft, about 50 of which are capable of striking targets on the ground.[15] However, each time aircraft are launched to strike targets, many other strike-capable aircraft must be launched in support roles such as offensive counter air (OCA), defensive counter air (DCA), suppression of enemy air defenses (SEAD) and aerial refueling. This reduces a CVBG's lethality by reducing the number of targets it can attack when operating autonomously.

Probably the most noteworthy limitation inherent to carrier air operations is the severe shortfall of organic aerial refueling capability due to the elimination of the A-6 tanker. This significantly reduces the range from which strikes can be launched, limits the amount of time available to rally the strike package before a push into enemy territory and increases the number of low-fuel emergencies upon return.

In essence, the CVBG's primary advantages of short reaction time and a highly organized operational structure are countered by its limitations of endurance and lethality when operating autonomously. Operational commanders could surmount these shortfalls simply by supplying the JFACC afloat with strategic air assets to augment his ongoing operations.

STRATEGIC TANKER OPERATIONS

By integrating strategic tankers into his carrier-based air operations, operational

commanders could shorten the reaction time, lengthen the duration and increase the lethality of his response to a crisis. Most often, the KC-10 aircraft should be the tanker of choice because it is more widely forward based, has far greater range, has more cargo capacity and has far greater offload capability than any other tanker in the U.S. inventory (Appendix A). Also, KC-10s can receive fuel inflight, increasing their flexibility and availability. Unlike most tanker aircraft, all KC-10s are compatible with both male and female refueling systems at all times. This allows them to refuel virtually all U.S. military aircraft as well as many of those employed by traditional coalition partners of the United States.[16] Although the KC-10 offers much more capability than other tankers, operational commanders who understand the differences could make use of other tankers as well if the need should arise.

Tankers Shorten Reaction Time

Strategic tankers could shorten the reaction time of a CVBG because of their widely distributed basing, intercontinental range and large offload capability. In fact, U.S. Naval fighter aircraft have used KC-10 aircraft on several occasions in the past, laying the groundwork for future joint contingency operations. Although these strategic tankers are heavily tasked at any given time, operational commanders could provide them to a CVBG during an actual, high-priority crisis almost anywhere in the world at almost any time.

For example, there are currently 54 KC-10 and 442 KC-135 aircraft operating throughout the world. Therefore, no matter where a CVBG is, it will rarely be very far from tanker support.[17] Also, if additional refueling assets were needed, more tankers could come from distant locations in a very short time because of their intercontinental ranges.

Further, if a strike were needed before the CVBG could get within range of its targets, strategic tankers could provide an "air bridge" by refueling the entire strike package enroute to the target area. This dramatically increases strike ranges to the limits of aircraft oil

consumption and aircrew fatigue. After the strike, the tanker could offload ample fuel to bring the entire package back to the carrier, alleviating the gut-wrenching worries about aircraft running out of fuel before they are safely back onboard the ship.

Tankers Lengthen Endurance

Strategic tankers could also increase the length of time a CVBG could carry on full-scale flight operations. They could do this by keeping carrier aircraft aloft longer, allowing greater surface maneuverability and facilitating logistics.

The most obvious advantage of omnipresent tankers is the ability to keep carrier-based aircraft airborne longer. For example, aircraft performing support roles such as OCA, DCA and SEAD would normally have to recover to the carrier when short on fuel. Since constant coverage by support aircraft is critical during strike operations, replacement support aircraft would have to be launched early enough to be on station before the original support aircraft could leave. Therefore, in order to provide constant support, the carrier would be forced to perform more launches and recoveries, keeping two entire sets of support aircraft aloft during the transition time to and from the operations area. These extra sorties and this lost time also translate into more stress on the carrier aircraft maintenance operation. With the extra fuel from strategic tankers, the original support assets could stay on station longer, providing constant support with far fewer sorties.

Strategic tankers could also provide greater freedom of maneuver for the carrier. To carry on flight operations, a carrier must sail into the wind. Periodically, a carrier must suspend all launches and recoveries to sprint back downwind to gain maneuvering room. Since operations are moving from the blue water environment of the open ocean to the more confined, brown water of the littorals, these sprints occur more often. During these sprints, the CVBG must keep sufficient aircraft aloft for self-protection. Unfortunately, this reduces

its lethality by leaving few assets available for strike operations.

Additionally, S-3B aircraft are currently the most common organic tankers in a CVBG. Since the offload capability of these aircraft is very small, strategic tankers offer a much better solution (Appendix B). Also, the aircraft that would have been used in a refueling role could now be used for other operations. Therefore, relief from the air refueling burden would reduce stress on the CVBG by lowering the number of required launches and recoveries, decreasing the required maintenance and freeing more aircraft for other missions.

On a few isolated occasions, S-3Bs have received fuel from KC-10s, and then joined the KC-10 in refueling the rest of the CVBG's strike package. This "hose-multiplication" technique represents the type of synergy that could greatly enhance CVBG capabilities if it were to become the rule rather than the exception.[18]

Finally, strategic tankers could greatly enhance logistical support for a CVBG due to their considerable airlift capability. Although CVBGs are largely self-sufficient logistically, strategic tankers, as well as other strategic airlift platforms, could offer a rapid source of transportation for time-critical supplies, equipment and personnel. Since strategic tankers operate using airport facilities in so many forward locations, they could usually offload these supplies at an airfield relatively near the CVBG, speeding delivery and increasing endurance.

Tankers Increase Lethality

By using strategic tankers to keep carrier-based aircraft aloft longer, operational commanders could increase the lethality of CVBG operations, whether independent, in support of a Marine Air-Ground Task Force or in support of some other joint or combined force. If the carrier had fewer refueling sorties to generate, it would have more assets available to recover, reload and launch strike aircraft, significantly shortening the turnaround time required per aircraft.

Further, the strike aircraft within a package that launch earliest must wait to rally with the rest of the aircraft before prosecuting an attack, thereby shortening the amount of time the entire package can stay airborne and the range within which it can strike. With tanker support, aircraft could refuel before and after an attack, increasing both range and lethality.

An inherent hazard of littoral operations arises from the close proximity to land-based threats. With an abundance of tanker support, the CVBG could reach targets from farther away, operating farther from dangerous shores. The increased distance and warning time would reduce the threat to the CVBG, allowing it to launch fewer DCA assets. Again, these aircraft could be used to fill other roles, further reducing the stress on the CVBG.

Clearly, an operational commander could strike an enemy quicker, longer and harder than ever before by simply integrating strategic tankers into the carrier air operations. However, commanders could achieve even greater results by doing the same with strategic bombers.

STRATEGIC BOMBER OPERATIONS

By integrating strategic bombers into his carrier-based air operations, operational commanders could shorten the reaction time, lengthen the duration and increase the lethality of the response to a crisis. The most advantageous strategic bomber to employ is the B-52 because of its intercontinental range, its wide array of weaponry and its employment flexibility. The B-2 also offers intercontinental range, but has a more limited array of weaponry and somewhat less flexibility than the B-52 (Appendix C). The B-1 can offer utility because of its large payload, but its voracious appetite for fuel and its questionable mechanical reliability make it the least desirable of the strategic bombers (Appendix D). However, operational commanders who understand bomber capabilities and limitations could make exceptional use of any of them if the need were to arise.

Bombers Shorten Reaction Time

Strategic bombers could shorten the reaction time of a CVBG due to their extremely long range and enormous strike capacity. Although strategic bombers can reach any AOR quickly, they still depend on other aircraft to perform missions such as OCA, DCA, and SEAD.

Both B-52 and B-2 aircraft routinely practice "Global Power" training missions. During these missions, aircraft launch from their home bases in the continental United States (CONUS), strike targets on another continent and return to their home bases non-stop. In fact, one formation of B-52s flew a 48-hour mission completely around the globe.[19] Therefore, a bomber from the CONUS could strike a target anywhere in the world within approximately 24 hours of its launch.[20] On the first night of Operation Desert Storm, seven B-52G aircraft loaded with Conventional Air Launched Cruise Missiles (CALCMs) flew over 37 hours round-trip from the CONUS, the longest duration of any combat mission in history.[21] Moreover, two B-52H aircraft flew over 16,000 miles, the longest distance ever flown on a combat mission, to strike targets in Iraq during Operation Desert Strike.[22] In fact, carrier based F-14s provided OCA for the B-52s during the latter operation, setting a precedent for successful joint operations.

With the bomber's payload advantage over carrier-based aircraft, it could relieve the CVBG of a large portion of the strike burden (Appendix E). For example, a typical B-52 weapons load could include eight CALCMs and twelve Joint Direct Attack Munitions (JDAMs), while an F-18 could include only four JDAMs (Appendix F). Because of the reduced strike requirements, the carrier could concentrate all its efforts on providing OCA, DCA, SEAD and other combat support sorties. In the absence of strategic tanker support, more of the carrier's aircraft could be dedicated to organic refueling, allowing the mission package to launch from farther away, again shortening the CVBG's reaction time and easing

its self-protection requirements.

On the other hand, if the CVBG were already in the proper location, the operational commander could order it to commence full-scale, autonomous operations right away, even though it could not sustain such operations for very long. In this case, the carrier could immediately begin full-capacity operations, knowing that waves of bombers would soon arrive, allowing the carrier to slow its operational tempo and recover from its initial surge. Bomber augmentation could allow carrier air operations to start sooner and last longer.

Bombers Lengthen Endurance

Operational commanders could utilize strategic bombers to lengthen the duration of CVBG operations by alleviating operational stress and exercising flexible employment options. By providing the JFACC afloat with these extra assets, the operational commander could greatly enhance the chances for mission success.

Since bombers could assume a large portion of the strike burden, they could reduce the operational stress on a carrier by reducing the number of sorties it must support. This relief would increase the endurance of both personnel and machinery. For example, if the number of sorties required from a carrier could be cut in half, operations could be carried on using only two of the four catapults and arresting cables. Therefore, fewer deck personnel would be required to handle the reduced load. With some creative adjustments to the duty schedule, supervisors could release parts of each duty section for rotating rest periods, reducing deck crew fatigue and thus lengthening the carrier's endurance.[23] Reducing operational tempo would have a similar effect on aircrew members. Fewer sorties would translate into less fatigue and better aircrew availability for flight operations.

As slower operational tempo increases the endurance of personnel, it has the same effect on machinery. If fewer sorties are flown, less stress is put on each individual aircraft.

Therefore, each individual aircraft could spend more time in the hands of the maintainers. Further, using different sets of catapults and arresting cables at different times would leave the unused equipment available for maintenance. In essence, reducing the stress on a carrier allows more time for rest and maintenance, increasing the mean time between failures of both men and machines and increasing endurance.

Unfortunately, bombers can only relieve the stress on a CVBG while they are physically in the AOR and available to the JFACC. Luckily, operational commanders could utilize a wide array of employment options to shorten the turnaround time between bomber sorties within a given AOR. For example, bombers could launch from and recover to the CONUS. However, the long distances between the base of operations and the target area would lengthen the turnaround time and reduce the time an individual bomber is available to the JFACC.

When sufficient warning is available, the operational commander also has the option to move his bomber force to a forward operating base such as Guam in the Pacific Ocean, Fairford, England in Europe or Diego Garcia, British Indian Ocean Territory. The decreased distance between the bomber base and the AOR both shortens the initial reaction time and reduces the turnaround time for each individual bomber, keeping them in the fight more often.

Probably the most flexible option, especially without significant warning time before a strike, would be to launch from the CONUS, strike the targets and then recover to the most appropriate forward operating base. As the bombers launch from the CONUS, additional aircrews, maintainers, mission planners and other support personnel could depart via strategic airlift for the forward base along with the equipment that will be needed to immediately ready the recovering bombers for further strike operations. These options should give the operational commander enough flexibility to keep the JFACC supplied with bombers a great deal of the time, relieving the stress on the CVBG and therefore increasing its endurance.

However, getting the bombers to the AOR is only one consideration. They must then seamlessly amalgamate with carrier air operations, lengthening endurance as well as increasing lethality.

Bombers Increase Lethality

Operational commanders could utilize strategic bombers to dramatically increase the lethality of CVBG operations, tasking them to perform a variety of functions. In addition to strike missions, strategic bombers can perform Destruction of Enemy Air Defenses (DEAD), Battlefield Preparation, Close Air Support (CAS), Airborne Interdiction (XINT), and Sea Superiority to name just a few.

The simplest way to integrate bombers into carrier-based air operations would be to task them with strike missions, allowing the carrier air wing to concentrate on OCA, DCA, SEAD and other support missions. Another option would be to simply add the bomber strike missions to the strike missions already assigned to carrier-based aircraft. Operational commanders should select this option when they want to inflict heavy damage quickly.

When a CVBG is tasked to attack an enemy who has an integrated air defense system, bombers could safely perform DEAD by launching CALCMs from outside the threat area. With the radars, fixed missile sites and command centers destroyed, the enemy would be left blind, crippled, confused, and unable to effectively defend itself from the CVBG's onslaught.

Additionally, bombers could increase the lethality of CVBG operations in support of a surface force such as a Marine Air-Ground Task Force (MAGTAF), a SEAL Team or even a combined land component through battlefield preparation, CAS or XINT. Although Marine units prefer the support of their own Air Combat Elements, these land-based, tactical fighters are often unable to provide constant support for short-notice operations in remote AORs.[24]

CVBGs augmented with bombers could prepare the battlefield by disrupting or destroying

large numbers of an enemy's force, diminishing its capacity to harass the friendly ground forces. Under the protection of a carrier-based combat support package, bombers could perform CAS for the ground troops, receiving targeting information directly from a ground-based Forward Air Controller or Combat Control Team. Bombers could effectively protect friendly troops by striking an enemy's position with gravity munitions or halting its advance with thousands of anti-armour and anti-personnel mines. B-52s in particular could effectively support the land component because they carry up to ten laser-guided bombs per aircraft, relying on target-designation from fighter aircraft, helicopters or ground troops.

The addition of flexible, near-precision weapons like the JDAM and Wind Corrected Munitions Dispenser (WCMD) to the bomber inventory has dramatically increased the effectiveness of the XINT mission. In this role, several bombers could establish an orbit at a very high altitude near the anticipated target location and wait for information from a ground or air targeting asset. Upon receipt of the target description and location, the bomber crew would quickly select the proper type and number of weapons, desired impact pattern and coordinates. As soon as the launch-and-leave, self-guided munitions are on the way to their target, the bomber could accept its next targeting assignment.

Bombers could also help the sea component ward off surface threats and gain sea supremacy by employing Harpoon Missiles and a variety of sea mines. In fact, a single B-52s can carry eight missiles and up to 27 sea mines at a time.[25]

Therefore, with the weapons presently available, operational commanders could augment carrier-based aircraft with strategic bombers to provide swift, durable, deadly air support to all components. He could also use other strategic aircraft to enhance CVBG capabilities.

STRATEGIC SUPPORT AIRCRAFT OPERATIONS

By integrating other strategic aircraft into carrier-based air operations, operational

commanders could shorten the reaction time, lengthen the duration and increase the lethality of the response to a crisis. If a crisis were to escalate, the JFACC afloat could increase available combat capacity by gradually shifting the burden of certain missions from carrier-based aircraft to their strategic counterparts.

For example, U-2s and unmanned aircraft could utilize their long range and loiter capability to provide the operational commander with more rapid, flexible reconnaissance and post-strike bomb damage assessments than could carrier-based F-14 reconnaissance assets.[26] Strategic reconnaissance could reduce the CVBG's reaction time by providing critical intelligence to mission planners much earlier than carrier-based reconnaissance assets, and increase a CVBG's lethality by freeing carrier-based aircraft for other combat missions.

Still other strategic aircraft could provide advantages as a crisis escalates using similar logic. For example, E-8C JSTARS aircraft provide air-to-ground surveillance, freeing S-3B assets to perform other missions including strikes and inflight refueling.[27] Also, dividing airborne surveillance, and command, control and communications responsibilities between the carrier-based E-2C and the land-based E-3B aircraft could provide the operational commander with increased endurance.[28] Through a myriad of combinations, operational commanders could garner capabilities limited only by their imaginations. However, a few changes will be necessary to crystallize these benefits.

RECOMMENDATIONS

According to Joint Vision 2020, joint training is the linchpin to progress.[29] Effective interservice training would foster innovations in cooperation using present assets as well as the creative utilization of new technologies.[30] Operational commanders could quickly create true synergy between carrier-based and strategic aircraft simply by making a few adjustments in doctrine, training and equipment acquisition procedures.[31]

Occasionally, naval aircraft refuel from Air Force tankers, or Air Force bombers will simulate launching Harpoon Missiles under the guidance of a Naval targeting asset. However, for different branches or coalition partners to effectively unite in combat, they must train together under realistic conditions. Although the U.S. holds a few interservice exercises each year, they are too rare to achieve a homogenous, high level of readiness.

To gain synergy, commanders at all levels must integrate joint training at every possible opportunity. For example, strategic tankers should routinely refuel U.S. carrier-based and coalition aircraft on simulated strikes. Further, global power bomber missions should be integrated with CVBG simulated strikes to exercise all facets of that mission. Since all these assets would be conducting independent training anyway, there would be virtually no new cost associated with this integration. Operational commanders could make these changes and garner these benefits immediately simply by employing current personnel and equipment more efficiently and effectively, embracing the spirit of Joint Vision 2020 today.[32]

Clearly, the addition of strategic assets to carrier air operations would yield remarkable benefits. However, careful mission planning and coordination between carrier-based and land-based personnel would be an absolute requirement. Although the JFACC afloat and the strategic mission planning teams are located in different places, current communication equipment could make coordination easy if it were exercised routinely. Practiced operators can use video teleconferences, secure telephones and a secure Internet to instantly share tremendous amounts of information with geographically dispersed units. Establishing connectivity on a regular basis would drastically reduce the number of technical glitches during an actual operation, dramatically increasing the speed and clarity of communications.

Looking to the future, operational commanders could ensure that the different branches acquire compatible communication equipment, laying the groundwork for truly network

centric warfare.[33] The U.S. should also encourage its potential coalition partners to invest in compatible equipment when they make new acquisitions. The ability to share information such as Air Tasking Orders, mission planning materials, intelligence imagery, informational slides and voice communications could practically nullify the impact of operating from different locations and would drastically increase U.S. and coalition combat effectiveness. Best of all, since every U.S. and coalition unit must upgrade its communications equipment periodically, simply ensuring compatibility would cost nothing, but yield tremendous benefits.

CONCLUSION

Operational commanders could reduce their reaction time, lengthen their endurance and increase their lethality during short-notice military operations anywhere in the world by complementing carrier-based air operations with land-based strategic aircraft. A forward-based CVBG represents a quick, highly organized response, but lacks the sustainability and lethality of air operations the commander needs. Likewise, strategic aircraft can bring enhanced capabilities to a fight quickly, but lack a constant forward presence and on-scene command structure. While neither carrier-based nor strategic air power can independently give the operational commander the speed, sustainability and lethality he needs, the combination of the two surely could. Operational commanders could greatly enhance combat effectiveness right away by embracing the doctrine envisioned by Joint Vision 2020, with the existing assets from different branches actually working in concert rather than just in close proximity.[34] By providing carrier battle groups with strategic air assets, operational commanders could prosecute quicker, longer and heavier attacks simply by employing current assets with greater synergy.

NOTES

[1] Director for Strategic Plans and Policy, J5; Strategy Division, Joint Vision 2020. (Washington, DC: June 2000), 13.

[2] Robert C. Rubel, "Aircraft Carriers, Doctrine, and Operational Art," (Newport, RI: Naval War College, Naval Operational Planner Course, 1988), 3.

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[4] Director for Strategic Plans and Policy, Joint Vision 2020., 13.

[5] Edward F. Caffrey, Jr., personal interview by author, 10 January 2001, Naval War College, Newport, RI.

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Barksdale AFB, LA.

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[30] Ibid., 13.

[31] Ibid., 43.

[32] Ibid., 41.

[33] Ibid., 20.

[34] Ibid., 41.

APPENDIX A

KC-10 versus KC-135

Characteristic	KC-10	KC-135
Primary Function:	Aerial tanker and transport	Aerial refueling
Prime Contractor:	Douglas Aircraft Co., division of Boeing	The Boeing Company
Power Plant:	Three CF6-50C2 turbofans	KC-135R/T, Four CFM-56 turbofans KC-135E, Four TF-33-PW-102 turbofans
Thrust:	52,500 pounds per engine	KC-135R, 21,634 pounds per engine KC-135E, 18,000 pounds per engine
Length:	181 feet, 7 inches	136 feet, 3 inches
Height:	58 feet, 1 inch	41 feet, 8 inches
Wingspan:	165 feet, 4.5 inches	130 feet, 10 inches
Speed:	619 mph	530 mph
Ceiling:	42,000 feet	50,000 feet
Maximum Takeoff Weight:	590,000 pounds	322,500 pounds
Range (Loaded):	4,400 miles	1,500 miles
Range (Ferry):	11,500 miles	11,015 miles
Maximum Cargo Payload:	170,000 pounds	83,000 pounds
Maximum Fuel Load:	356,000 pounds	200,000 pounds
Crew:	Four	Four
Unit Cost: (FY 96 dollars)	$86.8 million	$52.2 million
Date Deployed:	March 1981	August 1965
Inventory:	Active force, 59; ANG, 0; Reserve, 0	Active duty, 373; ANG and Reserve, 268
Compatibility:	Both boom and drogue	Either boom or drogue

Air Mobility Command Public Affairs Office. "KC-10 Fact File." February 1998. <http://www.afinfo.af.mil/afpalib/factfile/aircraft/air-KC10.html/> [9 January 2001].

Air Mobility Command Public Affairs Office. "KC-135 Fact File." February 1998. <http://www.afinfo.af.mil/afpalib/factfile/aircraft/air-KC135.html/> [9 January 2001].

APPENDIX B

KC-10 versus S-3B

Characteristic	KC-10	S-3B
Primary Function:	Aerial tanker and transport	ASW, Sea Surveillance, Aerial Tanker
Primary Contractor:	Douglas Aircraft Co., division of Boeing	Lockheed
Power Plant:	Three CF6-50C2 turbofans	Two GE TF-34-GE-400B turbofans
Thrust:	52,500 pounds per engine	9,275 pounds per engine
Length:	181 feet, 7 inches	53 feet, 4 inches
Height:	58 feet, 1 inch	22 feet, 9 inches
Wingspan:	165 feet, 4.5 inches	68 feet, 8 inches
Speed:	619 mph	450 mph
Ceiling:	42,000 feet	40,000 feet
Maximum Takeoff Weight:	590,000 pounds	52,539 pounds
Range (Loaded):	4,400 miles	2300 miles
Range (Ferry):	11,500 miles	N/A
Maximum Cargo Payload:	170,000 pounds	N/A
Maximum Fuel Load:	356,000 pounds	8,500 pounds
Crew:	Four	Four
Unit Cost: (FY 96 dollars)	$86.8 million	$27 million
Date Deployed:	1981	1975
Compatibility:	Both boom and drogue	Drogue only

Air Mobility Command Public Affairs Office. "KC-10 Fact File." February 1998. <http://www.afinfo.af.mil/afpalib/factfile/aircraft/air-KC10.html/> [9 January 2001].

Naval Air Systems Command Public Affairs Office. "S-3b Viking Fact File." 9 June 1999. <http://www.chinfo.navy.mil/navpalib/factfile/aircraft/air-s3b.html/> [9 January 2001].

APPENDIX C

B-52 versus B-2

Characteristic	**B-52**	**B-2**
Primary Function:	Heavy bomber	Heavy bomber
Contractor:	Boeing Military Airplane Co.	Northrop Grumman Corp.
Power plant:	Eight TF33-P-3/103 turbofans	Four GE F-118-GE-100 engines
Thrust:	17,000 pounds per engine	17,300 pounds per engine
Length:	159 feet, 4 inches	69 feet
Height:	40 feet, 8 inches	17 feet
Wingspan:	185 feet	172 feet
Speed:	High subsonic	High subsonic
Ceiling:	50,000 feet	50,000 feet
Weight:	Approximately 185,000 pounds empty	Unspecified
Maximum Takeoff Weight:	488,000 pounds	336,500 pounds
Range:	Unrefueled Intercontinental (8,800 miles)	Unrefueled Intercontinental (unspecified)
Armament:	Approximately 70,000 pounds	40,000 pounds
Payload:	Conventional or nuclear weapons	Conventional or nuclear weapons
Crew:	Five	Two
Accommodations:	Six ejection seats	Two ejection seats
Unit Cost:	$74 million	Approximately $1.3 billion
Date Deployed:	February 1955	December 1993
Inventory:	Active force, 85; ANG, 0; Reserve, 9	Active force, 10; ANG, 0; Reserve, 0

Air Combat Command Public Affairs Office. "B-52 Fact File." February 1998. <http://www.afinfo.af.mil/afpalib/factfile/aircraft/air-b52h.html/> [9 January 2001].

Air Combat Command Public Affairs Office. "B-2 Fact File." June 2000. <http://www.afinfo.af.mil/afpalib/factfile/aircraft/air-b2.html/> [9 January 2001].

APPENDIX D

B-52H versus B-1B

Characteristic	B-52H	B-1B
Function:	Heavy bomber	Heavy bomber
Contractor:	Boeing Military Airplane Co.	Rockwell International
Power plant:	Eight TF33-P-3/103 turbofans	Four F-101-GE-102 turbofans/afterburner
Thrust:	17,000 pounds per engine	30,000 pounds per engine w/ afterburner
Length:	159 feet, 4 inches	146 feet
Height:	40 feet, 8 inches	34 feet
Wingspan:	185 feet	137 feet forward, 79 feet swept aft
Speed:	High subsonic	900-plus mph (supersonic)
Ceiling:	50,000 feet	30,000 feet
Weight:	Approximately 185,000 pounds empty	Approximately 190,000 pounds empty
Maximum Takeoff Weight:	488,000 pounds	477,000 pounds
Range:	Unrefueled Intercontinental (8,800 miles)	Unrefueled Intercontinental (unspecified)
Armament:	Approximately 70,000 pounds	42,000 pounds
Payload:	Conventional or nuclear weapons	Conventional weapons
Crew:	Five	Four
Accommodations:	Six ejection seats	Four ejection seats
Unit Cost:	$74 million	$200-plus million per aircraft
Date Deployed:	February 1955	June 1985
Inventory:	Active force, 85; ANG, 0; Reserve, 9	Active force, 51; ANG, 18; Reserve , 0

Air Combat Command Public Affairs Office. “B-52 Fact File.” February 1998. <http://www.afinfo.af.mil/afpalib/factfile/aircraft/air-b52h.html/> [9 January 2001].

Air Combat Command Public Affairs Office. “B-1 Fact File.” January 1999. <http://www.afinfo.af.mil/afpalib/factfile/aircraft/air-b1.html/> [9 January 2001].

APPENDIX E

Strike Capability Comparison

Ordnance	B-52H	FA-18C/D	B-2	B-1
Total ordnance weight:	70,000 lbs	13,700 lbs	40,000 lbs	42,000 lbs
2000 lb class bombs:	18	5 max / 2 standard	16	0
1000 lb class bombs:	0	5 max / 2 standard	0	0
750 lb class bombs:	45	0	0	0
500 lb class bombs:	45	24 max /12 standard	0	84
Unguided CBUs:	45	5	C	24
CALCM:	20	0	0	0
WCMD:	16*	0	0	24 **
LGBs:	10	5 max / 2 standard	0	0
HavNap Missiles:	4 (3 w/ data link)	0	0	0
Maverick	0	4	0	0
Harpoon Missiles:	8	4	0	0
500 lb class Sea Mines:	45	0	0	0
2000 lb class Sea Mines:	18	0	0	0
Land Mines:	45	0	0	0
Harm	0	5 max / 2 standard	0	0
SLAM	0	5 max / 2 standard	0	0
Nuclear ALCMs:	20	0	0	0
Nuclear ACMs:	12	0	0	0
Nuclear Bombs:	8	0	yes-unspecified	0
JDAM:	12	5 max / 2 standard	16	24 **
JSOW:	12 *	5 max / 2 standard	0	24 **

* Presently undergoing certification ** Projected capability within two years

Air Combat Command, 115 Thompson Street, Suite 211; Langley AFB, VA 23665-1987; DSN 574-5014 or (757) 764-5014. Current as of March 1999.

Lt Commander John Dixon, F-18 pilot, personal interview, 30 January 2001.

APPENDIX F

B-52H versus F-18C/D

Characteristic	B-52H	F-18C/D
Primary Function:	Heavy bomber	Multi-role Attack / Fighter
Contractor:	Boeing Military Airplane Co.	McDonnell Douglas / Northrop
Power plant:	Eight TF33-P-3/103 turbofans	Two F404-GE-402 engines w/ afterburner
Thrust:	17,000 pounds per engine	17,700 pounds per engine
Length:	159 feet, 4 inches	56 feet
Height:	40 feet, 8 inches	15 feet 3 inches
Wingspan:	185 feet	40 feet 5 inches
Speed:	High subsonic	Mach 1.7+
Ceiling:	50,000 feet	50,000 feet
Maximum Takeoff Weight:	488,000 pounds	51,900 pounds
Range:	Unrefueled Intercontinental (8,800 miles)	1,333 miles (Attack w/ external tanks)
Armament:	Approximately 70,000 pounds	13,700 pounds
Payload:	Conventional or nuclear weapons	Conventional weapons
Crew:	Five	One (FA-18C) / Two (FA-18D)
Accommodations:	Six ejection seats	One (FA-18C) / Two (FA-18D)
Unit Cost:	$74 million	$35 million
Date Deployed:	February 1955	November 1978

Air Combat Command, Office of Public Affairs, 115 Thompson Street, Suite 211; Langley AFB, VA 23665-1987; DSN 574-5014 or (757) 764-5014. Current as of March 1999.

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